

(12) United States Patent

Van Boxtel et al.

US 9,636,980 B2 (10) Patent No.:

(45) Date of Patent: May 2, 2017

(54) ROOF SYSTEM FOR A VEHICLE

(71) Applicant: Inalfa Roof Systems Group B.V., Venray (NL)

(72) Inventors: Eduardus Christianus Henricus Van

Boxtel, Zeeland (NL); Marcel Johan Christiaan Nellen, Merselo (NL)

Assignee: INALFA ROOF SYSTEMS GROUP

B.V., Oostrum (NL)

(*) Notice: Subject to any disclaimer, the term of this

patent is extended or adjusted under 35

U.S.C. 154(b) by 0 days.

(21) Appl. No.: 14/970,191

Filed: Dec. 15, 2015 (22)

(65)**Prior Publication Data**

> US 2016/0176273 A1 Jun. 23, 2016

(30)Foreign Application Priority Data

Dec. 17, 2014 (EP) 14198667

(51) Int. Cl.

B60J 7/047 (2006.01)B60J 7/043 (2006.01)B60J 7/02 (2006.01)

(52) U.S. Cl.

CPC B60J 7/0435 (2013.01); B60J 7/024 (2013.01)

(58) Field of Classification Search CPC B60J 7/024; B60J 7/043; B60J 7/0435 See application file for complete search history.

(56)References Cited

U.S. PATENT DOCUMENTS

7,828,376	B2*	11/2010	Nellen	B60J 7/0435
2013/0187412	A1*	7/2013	Nellen	296/216.03 B60J 7/024 296/216.05

FOREIGN PATENT DOCUMENTS

EP2554415 2/2013

* cited by examiner

Primary Examiner — Dennis H Pedder (74) Attorney, Agent, or Firm — Steven M. Koehler; Westman, Champlin & Koehler, P.A.

ABSTRACT

A roof system for a vehicle having a roof opening with a movable closure. A stationary guide rails guide operating mechanisms that operates the closure. The operating mechanism comprises a first device configured to move a rear edge upwardly and rearwardly and a second device including a lever to move a front edge of the closure. A guiding slide in the guide rail is coupled to the first device and the second device so as to move the closure. The lever has a pivotal connection to the closure and, remote from the pivotal connection, a sliding connection to the guiding slide by a first guide member and a sliding connection to a first stationary guide curve by a second guide member during movement of the closure. A third guide member on the lever of the second device engages a second stationary guide curve during movement of the closure.

15 Claims, 15 Drawing Sheets



